

PACIFIC PROPERTY
SW $\frac{1}{4}$, NE $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 19, T 6S, R 97W

HOLE NO. PAC - 4

DATE DRILLED 11/4/80 - 11/6/80

COORDINATES 623,472.8 NORTH 1,220,529.2 EAST

SURFACE ELEVATION 7,932.3 FEET

TOTAL DEPTH 656 FEET

CORED INTERVAL 400 - 656 FEET

LENGTH AND DIAMETER OF SURFACE CASING 20' x 6 5/8"

SIZE OF CORE 3 INCHES

CONTACT UINIA FORMATION - GREEN RIVER FORMATION 106 FEET

<u>KEY BEDS</u>	<u>DEPTH</u>	<u>ELEVATION</u>	<u>ELEVATION RELATIVE TO MM</u>
UPPER WAVY BED (BASE)	<u>522.6</u>	<u>7,409.7</u>	<u>+ 65.7</u>
A-GROOVE (BASE)	<u>569.0</u>	<u>7,363.3</u>	<u>+ 19.3</u>
MAHOGANY MARKER (TOP)	<u>588.3</u>	<u>7,344.0</u>	<u>0</u>
B-GROOVE (TOP)	<u>NA</u>	<u>-</u>	<u>-</u>

CLEVELAND — CLIFFS

1/11

HOLE NO. 4		PROJECT: Pacific Property					
RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION	
		P	P	JOINT	SLICK		C. I.
.00	400					.52	400.00' to 405.76' Oil Shale, medium to low grade, dark, pale and moderate yellow brown, thinly laminated.
#1	401						
RQD 100	402						
	403						
	404						
	405					.10	405.76' to 406.10' Oil Shale, medium grade, dark and dusky yellow brown, calcareous.
	406						405.83' Tuff lens.
	407						406.10' to 407.25' Oil Shale, medium grade, dark and moderate yellow brown.
	408						407.25' to 409.15' Oil Shale, medium to low grade, pale, moderate and dark yellow brown.
	409						409.15' to 410.18' Oil Shale, low to medium grade, pale and moderate yellow brown, thin laminations.
	410					.77	409.15' Tuff lens.
	411						410.18' to 411.84' Oil Shale, medium grade, dark yellow brown with some dusky yellow brown, thin laminations.
	412						411.84' to 414.02' Oil Shale, low grade, pale and some dark yellow brown, thin laminations.
	413						
.02	414					.02 .75 .87	414.02' to 416.40' Oil Shale, low to medium grade, pale, moderate and dark yellow brown, thin laminations.
#2	415	.21 .25					415.25' to 415.27' Tuff (sandy) band.
RQD 98	416					.84	
	417					.98	416.40' to 419.50' Oil Shale, low to medium grade, pale and dark yellow brown, thin laminations, calcareous.
	418						
	419						419.50' to 421.30' Oil Shale, low grade, pale and some dark yellow brown, thin laminations.
	420					.48	
	421						421.30' to 422.32' Oil Shale, medium grade, dark and some dusky yellow brown, thin laminations.
	422						421.60' to 421.63' Tuff
							422.32' to 426.84' Oil Shale, low to medium grade, moderate and some dark yellow brown.

CLEVELAND — CLIFFS

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		HOLE NO. 4	PROJECT: Pacific Property			
RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION
		P. P.	JOINT	SLICK	C. I.	
	423					
	424					
	425					
	426				.99	426.84' to 427.75' Oil Shale, low to medium grade, moderate and dark yellow brown, calcareous.
	427				.33	427.75' to 433.79' Oil Shale, low to medium grade, pale and dark yellow brown, thin laminations.
	428					
	429				.28	
					.96	
	430					
	431				.02	
					.84	
	432				.73	
	433				.07	433.79' to 434.56' Oil Shale, low grade, moderate and pale yellow brown, thin laminations, calcareous.
					.79	
	434					434.56' to 435.53' Oil Shale, medium grade, dark yellow brown, calcareous.
#3	435					435.53' to 441.88' Oil Shale, low grade, moderate and pale yellow brown.
RQD 100	436					
	437					437.57' to 437.59' Tuff
	438					
	439					
	440				.13	
	441					441.88' to 442.50' Oil Shale, medium grade, dark and dusky yellow brown.
	442				.93	442.50' to 443.90' Oil Shale, low to medium grade, moderate and dark yellow brown.
	443					
	444					443.90' to 448.68' Oil Shale, low grade, moderate and pale yellow brown, calcareous.
	445					
	446				.35	

CLEVELAND — CLIFFS-

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HOLE NO. 4		PROJECT: Pacific Property					
RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION	
		P	P	JOINT	SLICK		C. I
	447						
	448					.85	448.68' to 449.87' Oil Shale, medium grade, dark and dusky yellow brown.
	449						449.87' to 450.50' Oil Shale, medium grade, dark yellow brown.
	450						450.50' to 454.67' Oil Shale, medium grade, moderate and dark yellow brown.
	451						
	452					.93	
	453					.28	
.70						.70	
	454						454.67' to 456.38' Oil Shale, medium grade, dark and moderate yellow brown.
#4	455					.28	
RQD 100	456						456.38' to 461.20' Oil Shale, low to medium grade, pale and dark yellow brown, calcareous.
	457						
	458						
	459						
	460						
	461					.00	461.20' to 466.24' Oil Shale, medium grade, moderate and dark yellow brown, calcareous.
	462						461.89' to 461.90' Tuff.
	463						463.58' to 463.59' Tuff.
	464						464.68' to 464.82' Dark bands.
	464					.35	466.24' to 466.36' Oil Shale, medium grade, dark yellow brown band.
	465						466.36' to 466.40' Oil Shale, low to medium grade, moderate yellow brown, some dark yellow brown.
	466					.05	466.40' to 466.80' Oil Shale, medium grade, dark yellow brown band.
						.79	
	467					.28	466.80' to 468.65' Oil Shale, low to medium grade, moderate yellow brown, some dark yellow brown.
	468						468.65' to 470.45' Oil Shale, medium grade, dark and dusky yellow brown.
	469						470.22' Tuff.
	470					.30	470.45' to 472.65' Oil Shale, low to medium grade, pale and dark yellow brown.

CLEVELAND — CLIFFS

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HOLE NO. 4

PROJECT: Pacific Property

RUN		DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION
			P. P.	JOINT	SLICK	C. I.	
		471					
		472					
		473					472.65' to 473.77' Oil Shale, low to very low grade grayish orange and pale yellow brown.
.77		474				.77	473.77' to 474.35' Oil Shale, low grade, pale and moderate yellow brown.
		475					474.00' Tuff nodule.
#5		476					474.35' to 474.50' Oil Shale, medium grade, dark yellow brown.
RQD 86		477					
		478				.00	
		479				.60	474.50' to 479.00' Oil Shale, low to medium grade, moderate yellow brown, occasional dark yellow brown bands.
		480				.29	479.00' to 486.00' Oil Shale, medium to low grade, moderate and dark yellow brown, calcareous.
		481					
		482				.52	
		483				.58	
		484				.80	
		485		.45		.45	
		486					
		487				.28	486.00' to 486.50' Tuff band.
		488				.90	486.50' to 488.50' Oil Shale, medium to low grade, moderate yellow brown with some dusky yellow brown bands.
		489				.00	
		490				.58	
		491					488.50' to 489.35' Oil Shale, medium grade, moderate and dark yellow brown.
		492					
		493				.53	489.35' to 489.88' Tuff, with interbedded oil shale laminations.
		494				.07	489.88' to 493.44' Oil Shale, low grade, moderate yellow brown.
		495					
.44		496				.44	493.44' to 505.00' Oil Shale, low grade, pale and moderate yellow brown.
		497				.19	
		498					

CLEVELAND — CLIFFS -

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HOLE NO. 4		PROJECT: Pacific Property				
RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION
		P P	JOINT	SLICK	C. I.	
#6	495	.51			.51	
RQD 99	496					
	497					
	498					
	499					
	500	.45			.45	
	501					
	502				.69	
	503					
	504					
	505					505.00' to 506.96' Oil Shale, low to medium grade, pale and moderate yellow brown with some dark yellow brown bands.
	506					506.96' to 507.06' Tuff, gray, irregular band.
	507				.10	507.06' to 510.00' Oil Shale, low grade, pale and moderate yellow brown.
	508					
	509				.07	
	510	.42 .59				510.00' to 512.00' Oil Shale, very low grade, very pale orange and pale yellow brown.
	511					
	512	.20			.20	
	513	.38			.38 .45	512.00' to 514.00' Oil Shale, low to medium grade, pale and moderate yellow brown.
.45 X	514					514.00' to 515.00' Oil Shale, low grade, pale and moderate yellow brown.
#7	515					515.00' to 518.00' Oil Shale, very low grade, very pale orange.
RQD 100	516	.47				
	517					
	518					518.00' to 519.68' Oil Shale, low to medium grade, pale and moderate yellow brown.

CLEVELAND — CLIFFS

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		HOLE NO. 4		PROJECT: Pacific Property		
RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION
		P.P.	JOINT	SLICK	C. I.	
	519					519.68' to 519.81' Tuff, light gray, wavy
	520	.20				519.81' to 520.15' Oil Shale, low to medium grade, pale and moderate yellow brown.
	521	.41				520.15' to 520.45' Tuff, light gray, wavy.
	522	.14			.82	520.45' to 521.24' Oil Shale, low grade, pale yellow brown.
	523					521.24' to 522.56' Wavy bed, tuff-sandstone, contorted, light to medium gray, soft sediment deformation.
	524					522.56' to 523.50' Oil Shale, low to medium grade, pale and moderate yellow brown.
	525				.70	523.50' to 526.80' Oil Shale, low grade, pale yellow brown.
	526					526.80' to 527.00' Oil Shale, medium grade, pale and dark yellow brown, calcareous.
	527					527.00' to 529.00' Oil Shale, low grade, pale yellow brown.
	528	.45			.45	
	529					529.00' to 529.50' Oil Shale, low to medium grade, pale and dark yellow brown.
	530					529.50' to 530.50' Oil Shale, medium grade, dark yellow brown.
	531					530.50' to 533.42' Oil Shale, low grade, pale yellow brown, calcareous.
	532					
.42 X	533				.42	533.42' to 539.00' Oil Shale, low grade, pale and moderate yellow brown, calcareous.
	534					
#8	535					
RQD 94	536					
	537					
	538					
	539	.10	.10			539.00' to 540.00' Oil Shale, very low grade, very pale orange and pale yellow brown.
	540	.83	.11		.83	540.00' to 542.50' Oil Shale, low grade, pale and moderate yellow brown.
	541				.61	
	542					542.50' to 545.40' Oil Shale, low to medium grade, pale, moderate and dark yellow brown.

CLEVELAND — CLIFFS

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		HOLE NO. 4		PROJECT: Pacific Property		
RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION
		P P	JOINT	SLICK	C. I.	
	543					
	544					
	545					
	546				.56	545.40' to 548.10' Oil Shale, very low grade, very pale orange.
	547					
	548					548.10' to 549.40' Oil Shale, high grade, dusky and dark yellow brown, slightly calcareous.
	549					549.40' to 553.50' Oil Shale, low grade, pale and moderate yellow brown.
	550					
	551				.71	
	552					
*29	553				.29	553.50' to 554.50' Oil Shale, medium grade, pale, dark, and moderate yellow brown.
	554					554.50' to 557.80' Oil Shale, low grade, pale and moderate yellow brown.
#9	555					
RQD 98	556				.38	
	557					557.80' to 558.50' Oil Shale, medium grade, dark and pale yellow brown.
	558				.14	558.50' to 563.00' Top of A-Groove, Oil Shale, very low grade, very pale orange, and some pale yellow brown thin laminations. Biscuit fractures along parting planes.
	559					
	560					
	561	.95 .08 .26 .74				
	562	.03 .44 .83				
	563					563.00' to 565.00' Oil Shale, low grade, pale yellow brown, calcareous.
	564	.35				
	565	.21				565.00' to 569.00' Oil Shale, very low grade, very pale orange.
	566	.21				

CLEVELAND — CLIFFS

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HOLE NO. 4		PROJECT: Pacific Property				
RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION
		P P	JOINT	SLICK	C. I.	
	567					
	568	.29				
	569					569.00' to 571.00' Oil Shale, low grade, pale yellow brown with thin light gray tuff laminations.
	570				.96	Base of A-Groove
	571					571.00' to 572.50' Oil Shale, medium grade, pale, moderate and dark yellow brown.
	572					572.50' to 575.00' Oil Shale, low to medium grade, pale and moderate yellow brown.
23 *	573				.18 .23	
#10	574				.57	
RQD 99	575				.05	575.00' to 575.70' Oil Shale, low to medium grade, irregular dark yellow brown and very pale orange bands.
	576				.25 .72	575.70' to 576.30' Oil Shale, low to medium grade, pale and moderate yellow brown.
	577				.65	576.30' to 576.83' Oil Shale, high grade, dusky and dark yellow brown, thinly laminated.
	578					576.83' to 577.25' Tuff, irregular bedding.
	579	.55				577.25' to 578.00' Oil Shale, high grade, dusky and dark yellow brown, thinly laminated.
	580					578.00' to 580.00' Oil Shale, low grade, pale yellow brown.
	581				.86	580.00' to 581.00' Oil Shale, medium to high grade, dark and dusky yellow brown.
	582					581.00' to 582.00' Oil Shale, low to medium grade, pale and moderate yellow brown.
	583					582.00' to 588.32' Oil Shale, low grade, pale yellow brown.
	584					
	585					
	586					
	587				.90	
	588				.56 00	588.32' to 588.72' Mahogany Marker, medium light gray siliceous tuff with sandy texture.
	589				.99	588.72' to 592.15' Oil Shale, low grade, pale and moderate yellow brown.
	590					

CLEVELAND — CLIFFS —

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HOLE NO. 4						PROJECT: Pacific Property	
RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION	
		P P	JOINT	SLICK	C. I.		
	591						
	592	.42				592.15' to 594.00' Oil Shale, high grade, dusky and dark yellow brown.	
.20 *	593				.10 .20		
#11	594					594.00' to 595.50' Oil Shale, low to medium grade, pale, moderate and dark yellow brown.	
RQD 98	595					595.50' to 596.50' Oil Shale, high grade, dusky yellow brown, slightly calcareous.	
	596	.89				596.50' to 599.00' Oil Shale, medium to high grade, dark and dusky yellow brown.	
	597	.73 .94			.73 .94		
	598	.01			.01		
	599					599.00' to 600.00' Oil Shale, high grade, dusky yellow brown thinly laminated.	
	600						
	601					600.00' to 604.50' Oil Shale, medium to high grade, dark and dusky yellow brown, thinly laminated.	
	602				.26		
	603						
	604					604.50' to 605.10' Oil Shale, low to medium grade, pale and moderate yellow brown.	
	605				.29	605.10' to 605.90' Oil Shale, medium grade, dark, moderate and pale yellow brown.	
	606					605.90' to 606.59' Oil Shale, high grade, dusky yellow brown.	
	607					606.59' to 607.03' Tuff, light gray bed.	
	608				.50	607.03' to 608.00' Oil Shale, medium grade, moderate and dark yellow brown.	
	609					608.00' to 611.30' Oil Shale, low to medium grade, pale and moderate yellow brown.	
	610						
	611	.02				611.30' to 613.80' Oil Shale, low grade, pale yellow brown.	
	612				.70		
.17 *	613				.11 .17	613.80' to 614.50' Oil Shale, low to medium grade, pale and dark yellow brown.	
	614					614.50' to 615.20' Oil Shale, high grade, dusky and dark yellow brown, thinly laminated, slightly calcareous.	

CLEVELAND — CLIFFS -

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HOLE NO. 4						PROJECT: Pacific Property	
RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION	
		P P	JOINT	SLICK	C. I.		
#12	615	.59				615.20' to 615.59' Oil Shale, medium grade, dark and moderate yellow brown.	
RQD 89	616					615.59' to 616.20' Oil Shale, low to medium grade, pale, moderate and dark yellow brown.	
	617					616.20' to 616.80' Oil Shale, medium grade, dark yellow brown.	
	618					616.80' to 619.60' Oil Shale, low to medium grade, pale and moderate yellow brown.	
	619					619.60' to 620.20' Oil Shale, medium grade, dark and moderate yellow brown.	
	620					620.20' to 620.55' Oil Shale, medium to high grade, dark and dusky yellow brown.	
	621					620.55' to 623.59' Oil Shale, pale and moderate yellow brown, calcareous.	
	622				.57 .90		
	623				.59 .70	623.59' to 623.70' Oil Shale, medium to high grade, dark and dusky yellow brown.	
	624				.51	623.70' to 624.51' Cavity (No Core).	
.51	625				.23	624.51' to 625.50' Oil Shale, high grade, dusky yellow brown.	
#13	626					625.50' to 626.00' Oil Shale, low to medium grade, pale, moderate and dark yellow brown.	
RQD 100	627				.69	626.00' to 629.20' Oil Shale, low grade, pale yellow brown, calcareous.	
	628						
	629					629.20' to 630.40' Oil Shale, low to medium grade, moderate and dark yellow brown.	
	630					630.40' to 631.30' Oil Shale, low grade, pale yellow brown, calcareous.	
	631					631.30' to 632.60' Oil Shale, low to medium grade, pale and dark yellow brown.	
	632					632.60' to 635.45' Oil Shale, medium grade, dark and moderate yellow brown.	
	633						
	634						
	635					635.45' to 636.00' Oil Shale, low grade, pale and moderate yellow brown.	
	636				.18	636.00' to 639.35' Oil Shale, very low grade, very pale orange and pale yellow brown.	
	637						
	638						

CLEVELAND — CLIFFS

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HOLE NO. 4

PROJECT: Pacific Property

RUN	DEPTH	FRACTURES				LITHOLOGIC DESCRIPTION
		P. P.	JOINT	SLICK	C. I.	
	639					639.35' to 640.15' Oil Shale, medium grade, dark and dusky yellow brown, some moderate yellow brown.
	640					640.15' to 641.30' Oil Shale, low grade, pale yellow brown, calcareous.
	641	.60			.60	641.30' to 644.04' Oil Shale, very low grade, very pale orange.
	642	.48			.48	
	643					
.09	644				.09	644.04' to 644.09' Tuff, sandy.
#14	645					644.09' to 645.00' Oil Shale, low grade, pale yellow brown with some dark yellow brown.
	646					645.00' to 645.28' Oil Shale, very low grade, very pale orange.
RQD 95	647	.18			.18	645.28' to 645.49' Tuff, medium gray, sulfides.
	648					645.49' to 646.70' Oil Shale, very low grade, very pale orange, some pale yellow brown.
	649					646.70' to 647.78' Oil Shale, high grade, dusky and some dark yellow brown.
	650				.20	647.78' to 648.50' Oil Shale, low grade, pale and moderate yellow brown.
	651					648.50' to 650.77' Oil Shale, very low grade, very pale orange, some pale yellow brown.
	652					650.77' to 651.00' Oil Shale, low to medium grade, moderate and dark yellow brown.
	653		.23		.23	651.00' to 652.10' Oil Shale, high grade, dusky and dark yellow brown thinly laminated.
	654		.73		.60	652.10' to 652.60' Oil Shale, low to medium grade, moderate and pale yellow brown.
	655				.07 .26	652.60' to 653.05' Oil Shale, low grade, pale yellow brown and very pale orange.
	656				.49	653.05' to 654.50' Oil Shale, very low grade, very pale orange, some pale yellow brown.
.26					.26	653.84' Thin band chert, light gray.
	End of Hole					654.03' Thin band chert, light gray.
						654.50' to 655.00' Oil Shale, low grade, pale and moderate yellow brown.
						655.00' to 655.44' Oil Shale, medium grade, dark and some dusky yellow brown.
						655.44' to 656.26' Tuff - sandstone, light gray, wavy laminations.